

### REMARKS

This communication responds to the Office Action dated April 16, 2008. No claims are amended, no claims are canceled, and no claims are added. As a result, claims 1-15 are now pending in this Application.

#### §103 Rejection of the Claims

Claims 1-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sharma et al. (U.S. Patent Publication No. US20040128512; hereinafter “Sharma”) in view of Chen et al. (“Symmetric phase-only matched filtering of Fourier Mellin transforms for image registration and recognition”; hereinafter “Chen”) and further in view of Pereira et al. (“Template based recovery of Fourier based watermarks using log-polar and log-log maps”; hereinafter “Pereira”). However, since a *prima facie* case of obviousness has not been properly established by the Office, the Applicant respectfully traverses the rejection of these claims.

#### 1) *The Applicable Law*

As discussed in *KSR International Co. v. Teleflex Inc. et al.* (U.S. 2007), the determination of obviousness under 35 U.S.C. § 103 is a legal conclusion based on factual evidence. *See Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*, 7, 1336-37 (Fed. Cir. 2005). The legal conclusion, that a claim is obvious within § 103(a), depends on at least four underlying factual issues set forth in *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17 (1966): (1) the scope and content of the prior art; (2) differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art; and (4) evaluation of any relevant secondary considerations.

Therefore, the test for obviousness under §103 must take into consideration the invention as a whole; that is, one must consider the particular problem solved by the combination of elements that define the invention. *See Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir.1985). The Examiner must, as one of the inquiries pertinent to any obviousness inquiry under 35 U.S.C. §103, recognize and consider not only the similarities but also the critical differences between the claimed invention and the prior art. *See In re Bond*, 910 F.2d 831, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990), reh'g denied, 1990 U.S.

App. LEXIS 19971 (Fed. Cir.1990). The fact that a reference teaches away from a claimed invention is highly probative that the reference would not have rendered the claimed invention obvious to one of ordinary skill in the art. *Stranco Inc. v. Atlantes Chemical Systems, Inc.*, 15 USPQ2d 1704, 1713 (Tex. 1990). When the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious. *Id.* p. 4 citing *United States v. Adams*, 383 U.S. 39, 51-51 (1966). Additionally, critical differences in the prior art must be recognized (when attempting to combine references). *In re Bond*, 910 F.2d 831, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990), reh'g denied, 1990 U.S. App. LEXIS 19971 (Fed. Cir.1990).

Moreover, the Examiner must avoid hindsight. M.P.E.P. § 2143.01 (citing *In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984)). That is, the Examiner cannot use the Applicant's structure as a "template" and simply select elements from the references to reconstruct the claimed invention. See *In re Gorman*, 933 F.2d 982, 987, 18 U.S.P.Q.2d (BNA) 1885, 1888 (Fed. Cir. 1991). The fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01.

2) *Application of § 103 to the Rejected Claims*

First, it is respectfully noted that Sharma is directed to digital watermarking processes. Sharma teaches that:

"Digital watermarking is a process for modifying media content to embed a machine-readable code into the data content. The data may be modified such that the embedded code is imperceptible or nearly imperceptible to the user, yet may be detected through an automated detection process." Sharma, paragraphs [0002] – [0003].

As a matter of contrast, the claims of the Application are directed to methods and apparatus to extract fingerprints from an audio signal. The Application notes that:

"Fingerprints, in the literature sometimes referred to as hashes or signatures, are binary sequences extracted from multimedia contents, which can be used to identify said contents. Unlike cryptographic hashes of data files (which change as

soon as a single bit of the data file changes), fingerprints of multimedia contents ... are to a certain extent invariant to processing ... This is generally achieved by extracting the fingerprint from perceptually essential features of the contents.” Application, pg. 1, lines 6-12.

In other words, the digital watermarking taught by Sharma, and the fingerprints recited in the claims of the Application, are two different things. Watermarking is “imperceptible or nearly imperceptible to the user”, whereas a fingerprint is extracted from “perceptually essential features of the contents”. Thus, Sharma, which uses a Fourier-Mellin transform to perform a log polar remapping of transformed image blocks as part of a watermark detection process, is non-analogous to the claimed embodiments. *See* Sharma, paragraphs [0113]-[0114].

Second, while the Office asserts that “Sharma et al. teaches a method of extracting a fingerprint ... comprising the steps of ... extracting a set of robust features from an audio signal ... [and] subjecting the extracted set of features to a Forier-Mellin transform to compensate for speed changes in the audio signal ...”, this series of activities are never described in this reference. Indeed, as noted by others in the field (see prior response to the Non-Final Office Action mailed April 16, 2008), not all applications work well with this technique.

For example, Chen discovered that even when the Fourier-Mellin transform is improved by using FMI-SPOMF (Fourier-Mellin Invariant – Symmetric Phase Only Matched Filtering), the results are poor in certain applications. Thus, when FMI-SPOMG was applied to matching fingerprint images, Chen noted that the results were “inferior to those observed with the other applications ...”. *See* Chen, pg. 1165, Col. 2. Indeed, only 54.97 % PD (percent discrimination) was achieved when identical fingerprint images were compared. *See* Chen, pg. 1161, Col. 1. Since the PD is a relative measure of similarity between images, this means that when identical fingerprint images were compared, the FMI-SPOMF technique rendered barely more than an even chance that the images were “similar”. In fact, comparisons of dissimilar images provided up to 41.78 % PD. *See Id.*

Thus, the statement by the Office with respect to Sharma and the potential viability of using a Fourier-Mellin transform to identify fingerprints in audio applications is not supported by evidence in the record. Further, the Applicant was unable to find anything within the bounds of Sharma that teaches how one should apply the Fourier-Mellin transform to an audio signal – so that reliable results would be obtained, and the problems due to differences in scaling and

rotation, encountered when this technique is used with images (as taught by Sharma), might be avoided. *See, e.g.*, Rhoads et al. (U.S. Patent No. 6,408,082), Col. 4, lines 1-22 and Chen, pg. 1157, Col. 1.

Third, the Office admits that “Sharma fails to specifically teach the feature sequence constitutes the fingerprint ...” and proposes to combine Sharma and Chen to remedy this deficiency. However, this proposition overlooks the specific language of Chen, which teaches away from the combination. Indeed, Chen contradicts the motivation set forth by the Office for combining the references (i.e., “... it would have been obvious ... to transfer the sequence constituting the fingerprint in Sharma in order to have a high discriminating power and excellent robustness in the presence of noise.”

Chen states:

“... the correct print yields the highest maximum, although the difference with the other, mismatched, prints is less than a factor of two. This result is nevertheless significant, because the usual cross-correlation method, which we applied in comparison, did not yield any correct matching. These results are inferior to those observed with the other applications presented in this paper, **indicating the FMI-SPOMF is not optimal for fingerprint recognition.**” *See* Flannery, Col. 2, lines 22-50 (emphasis added).

Thus, it is clear that Chen explicitly teaches away from using FMI-SPOMF with respect to matching fingerprint images.

As noted in a prior response, the Applicant respectfully submits that the combination of limitations in independent claims 1 and 8 yield an unpredictable result, namely, compensating for speed changes in an audio signal to provide a speed invariant fingerprint. Since the result of the claimed features is not predictable, and because Chen teaches away from the use of FMI-SPOMF with respect to fingerprint recognition, one of ordinary skill in the art would have no reasonable expectation of success when considering the combination of Sharma and Chen. Therefore, it is improper to combine Sharma with Chen to remedy the deficiency of Sharma, namely, a failure to describe or suggest transforming audio signal features to extract an audio fingerprint. The addition of Pereira does nothing to remedy this deficiency.

Finally, none of the references address the claimed feature of “subjecting the extracted set of features to a Fourier-Mellin transform **to compensate for speed changes in the audio**

signal.” (claims 1 and 8, emphasis added). This element is not taught or suggested by Sharma, Chen, or Pereira. Thus, no combination of the references can provide this feature.

Therefore, independent claims 1 and 8, reciting the transformation of extracted perceptual features from an audio signal to provide a fingerprint that compensates for speed changes in the audio signal, are nonobvious. In addition, any claim depending from a nonobvious independent claim is also nonobvious. See M.P.E.P. § 2143.03. Therefore, claims 2-7 and 9-15 should also be in condition for allowance, and the Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-15 under 35 U.S.C. § 103(a).

### CONCLUSION

It is respectfully submitted that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone the undersigned at (210) 308-5677 to facilitate prosecution of this Application. If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date JANUARY 29, 2009

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 29<sup>th</sup> day of January 2009.

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